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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/024,554	12/21/2001	Michael E. Dobbs	0029-0002	3628

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EXAMINER	
CONNOLLY, PATRICK J	
ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/024,554	DOBBS, MICHAEL E.	
	Examiner	Art Unit	
	Patrick J Connolly	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see pages 2-7, filed January 20, 2004, with respect to the rejection of claims 1, 2, 8, 9, 10, 18, 20 and 22-24 under 35 U.S.C. 102(b) anticipated by U.S. Patent No. 4,413,905 to Holzapfel have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of 35 U.S.C. 103(a) by U.S. Patent 5,757,488 to Melton et al. in view of U.S. Patent No. 4,413,905 to Holzapfel.

Applicant's arguments, see pages 2-7, filed January 20, 2004, with respect to the rejection of claims 3-7, 11-17, 19 and 21 under 35 U.S.C. 103(a) taught by U.S. Patent No. 4,413,905 to Holzapfel have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of 35 U.S.C. 103(a) by U.S. Patent 5,757,488 to Melton et al in view of U.S. Patent No. 4,413,905 to Holzapfel.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,757,488 to Melton et al (hereafter Melton) in view of U.S. Patent No. 4,413,905 to Holzapfel (hereafter Holzapfel).

As to claim 1, Melton teaches a method of interferometry including:

generating radiation having a known wavelength profile (see column 4, lines 49-65);

producing an interference pattern (see column 5, lines 33-38).

measuring the interference pattern (see column 5, lines 44-54); and

calculating one or more lengths within the interferometer using the measured interference pattern (see discussion of measurement of zero path difference (ZPD), also column 7, lines 18-27).

Melton does not teach amplifying the radiation.

Holzapfel teaches a laser range meter including optical amplification of the measurement radiation (see column 6, lines 13-17, also column 7, lines 55-62) including optical amplification's advantage of improving signal the signal to noise ratio of detected optical signals.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the optical amplification technique of Holzapfel in combination with the interferometric technique of Melton in order to improve signal quality by increasing the signal to noise ratio.

As to claim 2, Melton teaches that coherent sources may be used (see discussion of the disadvantages of He-Ne lasers and solid-state laser diodes column 2, lines 9-25).

As to claim 3, Melton teaches emitting noncoherent radiation from a neon lamp.

With further regard to claim 3, Melton does not teach focusing the radiation from said lamp. It is well known in the art to focus optical beam to improve accuracy. It would have been obvious to one of ordinary skill in the art at the time of invention to focus the beam of Melton in order to improve accuracy.

As to claim 4, Melton teaches filtering the radiation to obtain wavelengths within a spectral band (See column 4, lines 63-65).

As to claim 5, while Holzapfel does not teach a specific amplification range for the optical amplifier, it would have been obvious to one of ordinary skill in the art at the time of invention to choose an appropriate level for the amplifier to boost the signal based upon the detector noise.

As to claim 6, Melton teaches adjusting wavelength scaling (see column 4, lines 25-37).

As to claim 7, Melton teaches calculating an amount of movement by a mirror within the interferometer (see Figure 3, Mx).

As to claim 8, Holzapfel teaches that the optical amplifiers create a second harmonic generation effect, which while doubling the frequency of the beam will therefore half the wavelength (see column 6, lines 39-50).

As to claim 9, Melton teaches interpolating between zero crossings of the interference pattern by counting fringes (see column 6)

As to claim 10, Melton teaches an interferometer including (See Figure 3 below):

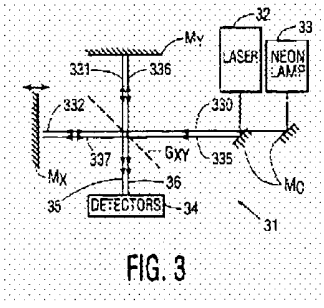

FIG. 3

a radiant source configured to emit radiation (33);

at least two optical elements configure to produce an interference pattern from the amplified radiation (Mx, My, Gxy); and

a detector configured to detect the interference pattern and generate data therefrom (34).

Melton does not teach an optical amplifier or processor.

Holzapfel teaches using optical amplifiers to produce amplified radiation in order to improve the signal to noise ratio of the detected optical signals.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the optical amplifiers of Holzapfel in combination with the interferometer of Melton in order to improve signal quality by increasing the signal to noise ratio.

Processors are notoriously well known in the art for use in performing measured data based calculations quickly. It would have been obvious to one of ordinary skill in the art at the time of invention to include a processor configured to make the measurements discussed above with regards to claims 1-9.

As to claim 11, Melton teaches that a solid-state laser diode could be used (see column 2, lines 9-25).

As to claim 12, Melton teaches a neon gas discharge lamp.

As to claim 13, Melton teaches an optical filter configured to pass a narrow spectral band of radiation (see column 4, lines 60-65).

Neither Melton nor Holzapfel teach a lens configured to deliver radiation to an optical amplifier.

The use of lenses is notoriously well known in the art for focusing and changing beam shapes. It would have been obvious to one of ordinary skill in the art at the time of invention to

include a lens to focus the radiation onto the amplifier so as to ensure all the radiation emitted from the source is amplified.

As to claims 14 and 15, while Holzapfel does not teach a specific optical amplifier, erbium doped fiber amplifiers and semiconductor optical amplifiers are well known in the art and it would have been obvious to one of ordinary skill in the art at the time of invention to include these amplifiers in the interferometer of Melton based on the desired amount of amplification.

As to claim 16, Melton teaches a movable mirror (Mx).

As to claim 17, see the discussion of the processor with regards to claim 10.

As to claim 18, Holzapfel teaches that the optical amplifiers create a second harmonic generation effect, which while doubling the frequency of the beam will therefore half the wavelength (see column 6, lines 39-50).

As to claim 19, neither Holzapfel nor Melton teach a phase-locked loop circuit, these are notoriously well known in the art for use with processors in order to provide high degrees of noise immunity and narrow bandwidth. It would have been obvious to one of ordinary skill in the art at the time of invention to include a phase-locked loop circuit in combination with a processor with the interferometer of Melton for the aforementioned adavantages.

As to claim 20, Melton teaches a method of interferometry including:

generating radiation having a preciselyknown wavelength profile (see column 4, lines 49-65);

producing an interference pattern (see column 5, lines 33-38).

detecting the interference pattern (see column 5, lines 44-54); and

performing a length measurement from the detected interference pattern (see discussion of measurement of zero path difference (ZPD), also column 7, lines 18-27).

Melton does not teach amplifying the radiation or increasing a precision available for a length measurement.

Holzapfel teaches a laser range meter including optical amplification of the measurement radiation (see column 6, lines 13-17, also column 7, lines 55-62) including optical amplification's advantage of improving signal the signal to noise ratio of detected optical signals.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the optical amplification technique of Holzapfel in combination with the interferometric technique of Melton in order to improve signal quality by increasing the signal to noise ratio.

With further regard to claim 20, the combination of the optical amplification of Holzapfel with the interferometric method of Melton would also increase a precision available for a length measurement as it would improve the signal to noise ratio.

As to claim 21, Melton teaches calibrating data obtained within the spectrometer using the length measurement (see column 6).

As to claims 22 and 24, Holzapfel teaches that the optical amplifiers create a second harmonic generation effect, which doubles the frequency of the beam and therefore halves the wavelength (see column 6, lines 39-50).

As to claim 23, Melton teaches interpolating between zero crossings of the interference pattern by counting fringes (see column 6)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J Connolly whose telephone number is 571.272.2412. The examiner can normally be reached on 9:00 am - 7:00 pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571.272.2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

pjc PJC
07.06.2004

Samuel A. Turner
Primary Examiner